WHAT IS CLAIMED IS:

1. An inductor comprising a laminated structure in which an insulating layer and a wiring layer are layered alternately on a semiconductor substrate, wherein said laminated structure comprises a first layer structure, a second layer structure and a first insulating layer interposed between them, said first layer structure comprising a first wiring layer on which a first winding part and a second winding part wound around on the same plane are disposed adjacently to each other, said second layer structure comprising a second wiring layer on which a first wiring part is disposed having a single path from one terminal thereof to the other terminal thereof, said first insulating layer comprising a first via hole and a second via hole connecting said first wiring layer to said second wiring layer,

wherein a first terminal of said first winding part is connected to a second terminal of said first wiring part through said first via hole and a third terminal of said second winding part is connected to a fourth terminal of said first wiring part through said second via hole, and

whereby a current flows around said first winding part from a fifth terminal thereof to said first terminal thereof and a current flows around said second winding part from said third terminal thereof to a sixth terminal thereof, with the directions of those currents being opposite to each other when a voltage is applied between said fifth terminal of said first winding part and said sixth terminal of said second winding part.

2. The inductor according to claim 1, wherein said first wiring part consists of at least one of a first portion which is opposed to a region between

said first and second winding parts and a second portion which extends along winding directions of said first and second winding parts, and said first wiring part has a symmetric form with respect to its central point.

3. The inductor according to claim 1, wherein said first layer structure further comprises a third wiring layer on the opposite side of said second wiring layer with respect to said first wiring layer and a second insulating layer interposed between said first and third wiring layers,

said second insulating layer comprises a third via hole and a fourth via hole connecting said first wiring layer to said third wiring layer,

a third winding part and a fourth winding part wound around on the same plane are disposed adjacently to each other on said third wiring layer,

said third winding part comprises a seventh terminal electrically connected to said first terminal of said first winding part through said third via hole and a eighth terminal connected to said fifth terminal of said first winding part,

said fourth winding part comprises a ninth terminal electrically connected to said third terminal of said second winding part through said fourth via hole and a tenth terminal connected to said sixth terminal of said second winding part, and

whereby a current flows around said third winding part from said eighth terminal thereof to said seventh terminal thereof and a current flows around in said fourth winding part from said ninth terminal thereof to said tenth terminal thereof, with the direction of the current flowing around said third winding part being the same as the direction of the currents flowing

around said first winding part, and the direction of the current flowing around said fourth winding part being the same as the direction of the current flowing around said second winding part when a voltage is applied between said fifth terminal of said first winding part and said sixth terminal of said second winding part.

4. The inductor according to claim 1, wherein said first layer structure further comprises a third wiring layer on the same side of said second wiring layer with respect to said first wiring layer and a second insulating layer interposed between said first and third wiring layers,

said first insulating layer is interposed between said second and third wiring layers and comprises first and second via holes connecting said second wiring layer to said third wiring layer,

said second insulating layer comprises a third via hole and a fourth via hole connecting said first wiring layer to said third wiring layer,

a third winding part and a fourth winding part wound around on the same plane are disposed adjacently to each other on said third wiring layer,

said first terminal of said first winding part is connected to a seventh terminal of said third winding part through said third via hole, a eighth terminal of said third winding part is connected to said second terminal of said first wiring part through said first via hole, said fourth terminal of said first wiring part is connected to a ninth terminal of said fourth winding part through said second via hole and a tenth terminal of said fourth winding part is connected to said third terminal of said second winding part through said fourth via hole, and

whereby a current flows around said first winding part from said fifth terminal thereof to said first terminal thereof, a current flows around said second winding part from said third terminal thereof to said sixth terminal thereof, a current flows around said third winding part from said seventh terminal thereof to said eighth terminal thereof and a current flows around in said fourth winding part from said ninth terminal thereof to said tenth terminal thereof, with the directions of the currents flowing around said first and second winding parts being opposite to each other, the direction of the current flowing around said third winding part being the same as the direction of the current flowing around said first winding part, and the direction of the current flowing around said fourth winding part being the same as the direction of the current flowing around said second winding part when a voltage is applied between said fifth terminal of said first winding part and said sixth terminal of said second winding part.

5. The inductor according to claim 1, wherein said second layer structure is positioned between said first layer structure and said semiconductor substrate,

said second layer structure further comprises a third wiring layer positioned between said second wiring layer and said semiconductor substrate, a fourth wiring layer positioned between said third wiring layer and said semiconductor substrate, a second insulating layer interposed between said second and third wiring layers and a third insulating layer interposed between said third and fourth wiring layers,

said third wiring layer comprises a second wiring part having a

single path from one terminal thereof to the other terminal thereof and said fourth wiring layer comprises a third wiring part having a single path from one terminal thereof to the other terminal thereof,

said second layer structure comprises a third via hole penetrating said second insulating layer, said third wiring layer and said third insulating layer connecting said second wiring layer to said fourth wiring layer, a fourth via hole penetrating said third insulating layer and a fifth via hole penetrating said second wiring layer and said second insulating layer,

said second via hole and said fifth via hole form a sixth via hole connecting said first wiring layer to said third wiring layer,

said first, second and third wiring parts have straight-line parts which are in parallel with one another and arranged in the direction vertical to the surface of said semiconductor substrate,

said first terminal of said first winding part is connected to said second terminal of said first wiring part through said first via hole, said fourth terminal of said first wiring part is connected to a seventh terminal of said third wiring part through said third via hole, a eighth terminal of said third wiring part is connected to a ninth terminal of said second wiring part through said fourth via hole, and a tenth terminal of said second wiring part is connected to said third terminal of said second winding part though said sixth via hole,

a straight line connecting a center of winding of said first winding part to a center of the winding of said second winding part is vertical to a plane formed by said straight-line parts of said first, second and third wiring parts, and

whereby a current flows around said first winding part from said fifth terminal thereof to said first terminal thereof, a current flows around said second winding part from said third terminal thereof to said sixth terminal thereof, with the directions of the currents being opposite to each other when a voltage is applied between said fifth terminal of said first winding part and said sixth terminal of said second winding part.

6. The inductor according to claim 5, wherein each of said straight-line parts of said first, second and third wiring parts is disposed opposed to a region between said first and second winding parts.

7. The inductor according to claim 1, wherein said second layer structure further comprises an electromagnetic shielding plate made of a superconductor between said semiconductor substrate and the nearest wiring layer from said semiconductor substrate.

8. The inductor according to claim 1, wherein each of said winding parts is wound around in a circle or in the shape of a polygon with more angles than a rectangle.